

# Work Order ID 80114

\*80114\*

Page 1

February-10-12 10:05:56 AM

Item ID: D6104-005 Accept \*N900040100\* Setup Start \*NS1\*  
 Revision ID: Stop \*NS2\*  
 Item Name: Round Billet, 17-4  
 Start Date: 10/02/2012 Start Qty: 16.00 \*16\* Cust Item ID:  
 Required Date: 24/02/2012 Req'd Qty: 16.00 \*16\* Customer:  
 Reference:

Approvals: Process Plan: M.L.J. Date: 12/01/10 Tooling: Date: Run Start \*NR1\*  
 QC: Date: SPC (Y/N): Date: Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
D6104	Rev B

100 PURCHASING 0.00  
 \*100\*  
 Purchasing Memo 0.00  
 Purchasing Issue P/O: 16168 a)Description: S.S round billet b) Ø4.00" x 5.10" longc) Tolerance on all dimensions are +0.030"/-0.000" d) Material: 17-4PH Stainless steel (Ams 5643 or Aisi 630)e)One blank makes 2 partsf) Material certification required

110 Receive & Inspect for Damage & Mat'l Certs 0.00  
 \*110\*  
 Packaging Memo 0.00  
 Packaging Ensure material certification is attached

120 QC6- Inspect dimensions to drawing 0.00  
 \*120\*  
 QC Memo 0.00  
 Quality Control Ensure Material certification comply to Dwg D6104

CL 12/02/10 16

10/2/15 (16)

OK 12/02/16

16 15

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 80114

February-10-12 10:05:56 AM

**\*80114\***

Page 2

Item ID: D6104-005 Accept **\*N900040100\*** Setup Start **\*NS1\***  
 Revision ID: Stop **\*NS2\***  
 Item Name: Round Billet, 17-4  
 Start Date: 10/02/2012 Start Qty: 16.00 **\*16\*** Cust Item ID:  
 Required Date: 24/02/2012 Req'd Qty: 16.00 **\*16\*** Customer:  
 Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Identify as per dwg & Stock Location: <i>NAT47</i>	0.00							
<b>*130*</b>									
Packaging	Memo	0.00				<i>16</i>	<i>0</i>		
Packaging									
140	QC21- Final Inspection - Work Order Release	0.00							
<b>*140*</b>									
QC	Memo	0.00							
Quality Control									

*12/02/16*

*425 12/02/17*

*R 12/02/16*

*(14)*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

February-10-12 10:06:00 AM

Page 1  
7

Work Order ID: 80114

\*80114\*

Parent Item: D6104-005

\*D6104-005\*

Parent Item Name: Round Billet, 17-4

Start Date: 10/02/2012

Required Date: 24/02/2012

Start Qty: 16.00

Required Qty: 16.00

Comments: IPP A: 01.05.08New Issue EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6104-005P		Purchased	No			110	Each	0.0000	1	16			
*D6104-005P*									**				
17-4 SS Roundbar 4.00"OD													

16/4/12 (76)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

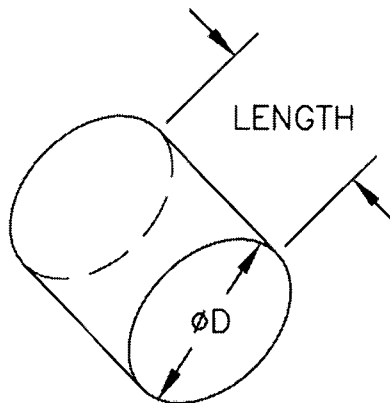


DESIGN 	DRAWN BY 	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED 	APPROVED 	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4	SCALE NTS
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED

02.11.29

## SPECIFICATION CONTROL DRAWING



SHOP COPY  
RETURNED  
ENCLOSURE  
UNCONTROLLED COPY  
SUBJECT TO APPROVAL  
WITH INVOICE  
WORK ORDER  
NO. 80114-M.C.5  
12/02/10

MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRc)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

Copyright © 2001 by DART AEROSPACE LTD

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



**Castle Metals®**

A. M. Castle &amp; Co.

## PACKING SLIP

Page 1 of 2

Shipment No:1188092

<b>Ship From:</b> A. M. Castle & Co. (Canada) Inc. MONTREAL 835-SELKIRK AVENUE POINTE CLAIRE, QUEBEC H9R 3S2		<b>Sold To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA		<b>Ship To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CAN		<b>Deliver To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA	
<b>Date Shipped</b> 15-FEB-2012	<b>F.O.B.</b> ORIGIN	<b>Freight Terms</b> Prepaid		<b>Carrier</b> MANITOULIN		<b>BOL No</b> 1188092-2	

## Shipment Details

Final Destination Branch - MON

<b>Order No</b> 2004085	<b>Line No</b> 1	<b>Item No</b> 42464.MO	<b>Description</b> 4.0000.RD.17CR-4NI.STAINLESS.RT.SOL TR.COND A.132.0000-156.0000 CUT TO 5.1 IN ( + .0620/- .0000 IN) - BAND SAW CUTTING SPECIFICATIONS: USE ONE HEAT ONLY SHIP WITH LINES 2 & 3 AMS 5643				
<b>Purchase Order No</b> 16168		<b>Part Number</b> YOUR ITEM NUMBER: D6104-005		<b>Ordered Qty</b> 16.00 PCS		<b>Invoice Qty</b> 16.00 PCS	
<b>Details</b>		USE ONE HEAT ONLY SHIP WITH LINES 2 & 3 AMS 5643					
<b>Delivery No.</b> 117369860	<b>Mill</b> OUTOKUMPU STAINLESS INC.	<b>Heat Number</b> 524906	<b>Mech Id</b>	<b>PCS</b> 16	<b>Width (IN)</b>	<b>Length (IN)</b>	<b>Shipped Qty(LBS)</b> 299.67

These commodities/technologies are subject to US Export Administration & US State Dept. Regulations and, if intended for export, were/are exported thereunder. Diversion contrary to US Law is Prohibited.

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description. Test reports are on file subject to examination. All claims for defective material are waived unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned.

These commodities, technology or software were exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to US law prohibited.

Date Printed: 15-FEB-2012 02:40:48 PM



**Castle Metals®**

A. M. Castle & Co.

PACKING SLIP

Page 2 of 2

for cred:			
Reviewed by Authorized Castle Metals Representative:		Date:	Name:



# Certificate of Test

HEAT 524906 ORDER 611545/ 05 BOL 0207994 \* CERTIFICATION \* 07/27/10

SHIP TO:  
A. M. CASTLE METALS  
3400 NORTH WOLF ROAD

FRANKLIN PARK 601310000

44586

YOUR ORDER & DATE  
7/27/10 CUST# 0254001 CUST TAG#42464

ITEM DESCRIPTION  
GRADE 17-4 Ship Condition CONDA  
Size 17-4 RND HRART CONDA 4.0000 x 144.000 RL  
Country of Melt: SWEDEN Country of Mfg.: UNITED STATES  
NAFTA Country of Origin is Country of Melt  
No weld repair  
Free of mercury contamination, Free of radiation contamination  
No WEEE relevant substances; Meets EU electrical ROHS

Total Bundles 1 Total Weight 1885

WO 2010049 Bundles: 1A

SPECIFICATIONS  
MFG TO FINISHED BAR IN THE USA FROM BILLETS IMPORTED SWEDEN  
AMS 2303E AMS 5643R  
ASME SA182 E07 A07, A08 & A09 ASME SA564 E07  
ASTM A484 09 ASTM A564 04 Type 630  
DFARS 252.225.7014 6/05 Reduction Ratio 3:1 minimum  
UNS S17400, AISI 630 No weld repair  
Free of Mercury Contamination AM Castle 3174-10 R8

MECHANICAL & OTHER TESTS  
Hardness as shipped 286 HB Hardness as tested 400 HB  
Hardness as shipped 030 HRC Hardness as tested ( 43 HRC )  
Grain size 5.0 Tensile strength, KSI (MPa) 196.0 (1351)  
Micro OK 0.2% Yield Strength, KSI (MPa) 175.0 (1207)  
Intergranular corrosion OK  
Macro OK Elongation % in 4D 13.0  
Ferrite 1.0 Reduction of area % 42.0

CHEMICAL COMPOSITION  
Carbon (C) .012 Manganese (Mn) .730  
Phosphorus (P) .021 Sulphur (S) .025  
Silicon (Si) .390 Chromium (Cr) 15.350  
Nickel (Ni) 4.710 Cobalt (Co) .034  
Copper (Cu) 3.270 Moly (Mo) .170  
Nitrogen (N) .021 Columbium (Cb) .350  
Titanium (Ti) .005 Aluminum (Al) .003  
Tin (Sn) .005 Cerium (Ce) .010  
Boron (B) .001 Tantalum (Ta) .005  
Vanadium (V) .051 .000  
Columbium/  
Tantalum (Cb+Ta) .355  
Iron (Fe) Balance  
Frequency .000 Severity .000  
Melt Practice EAF  
Refining Practice AOD  
De-long Ferrite

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes. We hereby certify that the test results shown in this report are correct and accurate as contained in the records of the company and are in compliance with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

*M.F. Marcanio*

HEAT NUMBER 524906  
MECHANICAL ID 42464  
ITEM CODE 42464  
LOT NUMBER 44886  
PO NUMBER 129-200  
RECEIPT DATE 04/24/2000  
SUPPLIER DUTRA MFG  
SPECIFICATION 10  
LCS 10  
COMMENT  
APPROVED 04  
Castle Metals FP

